unpolymerized portions and form a relief surface having raised areas that contrast in color with the floor.

Araki et al. disclose a photopolymerizable image-forming composition containing a binder of a polymeric material, photopolymerizable monomer or oligomer, photopolymerization initiator, reducing dye, and a VIb group onium salt-type photoactivator having an optical absorption wavelength range different from the photopolymerization initiator. Although Araki et al. suggest use of their photopolymerizable image-forming composition for relief printing plates, no examples are provided showing use in a relief printing plate, and the disclosure of Araki et al. is primarily directed to its application as a photoresist. Araki et al. disclose that the composition may contain 0.01 to 10 parts by weight of the reducing dye agent and 0.001 to 2 parts by weight of the VIb group onium salt photoactivator. In Example 1, a photopolymerizable composition containing a binder (polymethyl methacrylate), monomer, photoinitiators, a leuco dye, and an onium salt is coated to form a 2 mil (50 micron) layer on a support, which is then laminated to a copper side of an epoxy resin plate. The laminated plate was exposed to 90 millijoules of ultraviolet radiation from a high pressure mercury lamp for 20 seconds, resulting in unexposed parts of the layer being colorless, and exposed parts of the layer being colored purple.

Claim 1 specifically recites that the onium salt is present in greater reactive amount than the leuco dye. To prepare a flexographic printing plate from the photopolymerizable element, the element is exposed to actinic radiation for each of the main imagewise exposure, backflash exposure, and post-exposure. *The onium salt is present in greater reactive amount than the leuco dye* so that the leuco dye is completely reacted or substantially completely reacted with the onium salt during the main imagewise exposure of the element. After the main exposure, no or substantially no leuco dye is available to react with the excess onium salt. Thus, any further change in color contrast should not occur when the element is post-exposed. (The backflash exposure is typically much shorter than the main exposure, and thus sufficient exposure energy is not reached to induce the color change.) As shown in the Example starting on page 25 of the present specification, a photopolymerizable element having the leuco dye in greater amount than the onium salt, created color contrast after main exposure, but lost its color contrast after final post exposure/finishing. In order for the photopolymerizable element to retain color contrast in the resulting printing element, the onium salt must be in greater reactive amount than the leuco dye.

Araki et al. alone or in combination with the present background disclosure do not show or suggest that the onium salt is present in greater reactive amount than the leuco dye, as recited in Claim 1. Araki et al. disclose a proportion of each of the components in the composition, but the ranges disclosed appear to have the reducing agent (dye) in greater amounts than the onium salt photoactivator (see translation page 5, last paragraph). Araki et

al. disclose that the photopolymerizable composition contains the reducing agent, i.e., dye, at 0.01~10 parts by weight and the onium salt photoactivator at 0.001~2 parts by weight (based on 100 parts by weight of a binder), which suggests by way of comparison that the reducing agent (dye) overall is in greater amount than the onium salt photoactivator. This interpretation is substantiated in Example 1 of Araki et al. where the photoresist composition contains the dye reducing agent at 1.0 g and the onium salt at 0.1 g, that is, the amount of the dye is 10 times the amount of the onium salt. Araki et al. do not address how to retain the color contrast in a photopolymerizable element that undergoes multiple exposures. Thus, Araki et al. do not show or suggest a printing plate made from a photopolymerizable element wherein the photopolymerized layer has a relief surface with raised areas and a floor that contrasts in color with the raised areas, as recited in Claim 33. Araki et al. do not suggest color contrast between raised areas of a relief surface and the floor in the photopolymerized layer of a flexographic relief printing plate.

For the present invention, the criticality of the onium salt being in greater reactive amount than the leuco dye is demonstrated in the Examples. Example 1 forms a photopolymerizable printing element having a photopolymerizable layer of about 60 mils where the iodonium salt at 0.5% by weight is in greater reactive amount than the leuco Crystal Violet lactone dye at 0.25%. The photopolymerizable printing element was backflash exposed for 45 seconds to ultraviolet (UV) radiation and no color change was observed. The photopolymerizable printing element was then imagewise main exposed to UV radiation causing exposed areas to change color, and thus color contrast was observed between the exposed areas (polymerized portions became a dark blue color) and the unexposed areas (unpolymerized portions remained pink-red color). The photopolymerizable printing element was developed, dried, and post-exposed and the element *retained a color contrast between the polymerized raised image areas,* which were dark blue, *and the polymerized floor* which remained pink-red. In comparison as shown in the Example starting on page 25, a photopolymerizable element having the leuco dye in greater reactive amount than the onium salt will not retain the color contrast through the final process steps of forming a printing form. In this Example, a photopolymerizable element having a photopolymerizable layer of about 60 mils contains the Crystal Violet lactone dye at 0.5% by weight and the onium salt at 0.25%. This photopolymerizable printing element was exposed as described in Example 1, creating a color contrast between exposed and unexposed areas after main exposure, but lost its color contrast between the polymerized raised areas of the relief and the polymerized floor after final post exposure/finishing. Clearly, the present invention demonstrates that in order for the photopolymerizable printing element to retain color contrast in the final printing element, the onium salt must be in greater reactive amount than the leuco dye. Araki et al. do not teach or suggest how to retain color contrast throughout the process of multiple exposures

to form a photopolymerizable *printing* form where *exposed areas forming the relief surface change color* and ***exposed areas forming the floor of the printing form do not change color,*** thereby providing color contrast between the polymerized raised areas of the relief surface and the polymerized floor of the flexographic printing plate. An advantage of retaining the color contrast in the final flexographic printing form is that the color contrast facilitates mounting of the printing form in registration on a printing cylinder of a press.

The Examiner has indicated that one of ordinary skill in the art would have been reasonably motivated to employ the compounds in any amounts within their claimed ranges, and obtain a material wherein the onium salt compound is employed in greater amount than the dye. However, obviousness can not be established unless there is some teaching, suggestion or incentive from within a reference or a combination of references that would lead one of ordinary skill in the art to arrive at the claimed invention. The fact that Araki et al. merely disclose that the combination of a leuco dye and VIb group onium salt-type activator as an optical color coupler can be used in the photopolymerizable layer of a relief printing plate is not a sufficient suggestion or teaching that would lead one of ordinary skill in the art to specifically employ the onium salt in greater reactive amount than the leuco dye. Especially since Araki et al. do not teach or suggest color contrast between raised areas of a relief surface and the floor in the photopolymerized layer of a flexographic relief printing plate, to employ the onium salt in greater reactive amount than the leuco dye would constitute hindsight in view of the present invention. Araki et al. teach creating color contrast between exposed areas and unexposed areas in a layer of a photopolymerizable composition. Color contrast is also created between exposed areas and unexposed areas in a layer of a photopolymerizable elastomeric composition for the present photopolymerizable printing element. However, Araki et al. do not teach or suggest how to retain color contrast throughout the process of multiple exposures to form a photopolymerizable *printing* form where *exposed areas forming the relief surface change color* and ***exposed areas forming the floor of the printing form do not change color,*** and thereby provide color contrast between the polymerized raised areas of the relief surface and the polymerized floor of the flexographic printing plate. Thus, Applicant respectfully submits that the present photopolymerizable element comprising the photopolymerizable elastomeric layer as recited in Claim 1, wherein the VIb group onium salt is present in greater reactive amount than the leuco dye, is patentable over Araki et al. in view of Applicant's admission.

For the reasons stated above, the combination of Araki et al. with Applicant's admission does not render obvious a printing plate made from a photopolymerizable element wherein the photopolymerized layer has a relief surface with raised areas and a floor that contrasts in color with the raised areas, as recited in Claim 33. Araki et al. do not teach or

suggest color contrast between raised areas of a relief surface and the floor in the photopolymerized layer of a flexographic relief printing plate.

Claims 3 through 19, 31, 32 and 40 are dependent from Claim 1. Therefore, Claims 3 through 19, 31, 32 and 40 incorporate the patentable novelty of Claim 1, and the allowance of such claims over the cited references appears to be in order for at least the reasons given with respect to Claim 1.

Reconsideration and allowance of this application are respectfully requested.

Respectfully submitted,

Thomas H. Magee

THOMAS H. MAGEE
ATTORNEY FOR APPLICANT
REGISTRATION NO. 27,355
TELEPHONE: 302-892-0795
FACSIMILE: 302-892-7949

Dated: June 8, 2006